Web Services Primer
or
SOAP for Poets

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What is a Web Service?

- It's one **computer** asking another **computer** to do something via http and XML and possibly returning a result.

- It's similar to what we used to refer to as a Remote Procedure Call or RPC

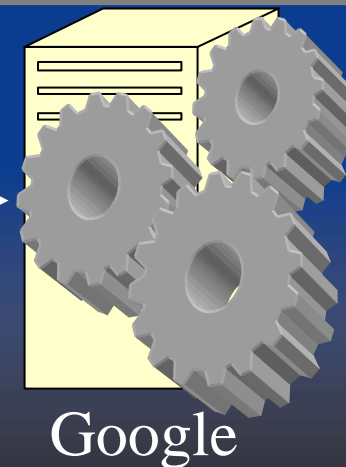# WWW as Example
(this is not a web service)

http://www.google.com/search?hl=en&q=aardvark

<html><head><meta HTTP-EQUIV="content-type" CONTENT="text/html; charset=UTF-8"><title>Google Search: aardvark </title><style><!--body,td,div,.p,a{font-family:arial,sans-serif }…
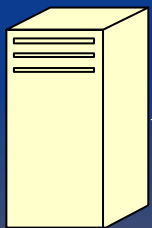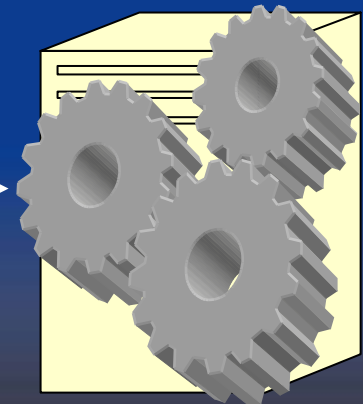
Firefox Browser

HTTP

Google

Web Service Demo!!!

To BigBob
Geocode
P1=534 Oak St.
A=

To BigBob
Geocode
P1=534 Oak St.
A = 33.76,-88.29

HTTP

Little
Larry

Big Bob

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So What's the Big Deal?

- Creates RPC's with **No New Technology**

- Uses HTTP and XML leveraging the most prevalent and understood server software in the Universe i.e. Web Servers and XML processors

- Mimics WWW request – response

- Vendor, operating system and computer language agnostic (well mostly)

WS Terminology

- Provider
- Consumer
- SOAP
- WSDL
- UDDI

WS Consumer and Provider

- The Provider is the host of the WS typically a Web Server Like IIS or Application Server like WebLogic, Tomcat….

- The Consumer is any program that is calling the WS often times on the behalf of a user but not always.

SOAP

- Simple Object Access Protocol
- This is an XML packet which is a common format for WS over http. SOAP is the protocol that carries the WS request and returns the response.

WSDL

- Web Services Description Language pronounced "wisdle"

- This is the XML schema that fully describes the WS.

- Given a WSDL almost all development environments can automatically generate a proper WS call

UDDI

- Universal Distribution Discovery and Interoperability

- This is a protocol for publishing WS information (white yellow and green pages)

- Provides information on a company like POC, services location etc as well as WSDL's

What Are Some Uses for WS in an AVR Context?

- Centralize Data or Services
- Aggregate Decentralized Data
- Expose Pieces of Functionality

Aggregate Decentralized Data

- Pull Data from Multiple Repositories
- Weather reports from across the country
- Air quality monitoring stations
- Messaging

Centralize Data or Services

- Denominator (Census) Data
- Specimen Numbering
- Geo-coding / Map building
- Vocabulary Validation – Thesaurus
- Single Source of Truth Data

Expose Functionality

- Generate an object Identifier (OID)
- In-process an employee

An Analogy

- Think of building a home and you are home owners
- Programmers are like construction workers
- And IT architects are like building architects
- Then WS are like UFD's (universal fastening devices   i.e. nails)

An Analogy Continued

- As homeowners you are most interested in how well the design meets your needs, and your interest in the UFD's (nails) is really confined to making sure that UFD's are the right choice and that the use of UFD's allow a house to be built to your needs.

But as nails do not a building create
Web Services do not an architecture equate.

Service Oriented Architecture (SOA)
(my version)

- If you are going to utilize WS in any enterprise fashion then you need an SOA

- An SOA is a plan to manage all these services throughout the enterprise.

- If you need an architecture then you need an architect … and a business analyst and a project manager and a …

What are the components of an SOA?

(what are then challenges of implementing a WS)

- What functionality to expose
- Catalog of WS's
- Authorization and Authentication
- Versioning
- Auditing
- Monitoring
- Redundancy Reliability Scalability
- Disaster Recovery
- etc. etc. etc

Problem:

Let's say you are doing a report on an ongoing case investigation. Let's also say you have a brand new surveillance system running on Intel hardware and a Linux operating system. Also you have a legacy system on a mainframe with data in it that you have not migrated over to the new system. Your report has needs for latitude and longitude for geospatial mapping and that while the new system may have this information, the old system definitely has only street addresses. Let's also assume that you want in the report the population of the all the adjacent counties as well as the population of the county of residence as specified in the latest update to the 2000 census data. Let's also say you want the count of all similar cases reported in the county of residence as well as the surrounding counties over the last 30 days and that your reporting server is running on Windows 2003.

Two Solutions:

- Move all the data to a common location (Data Warehouse approach)

- Leave the data where it is and gather it together as needed through a set of well defined web services. (Enterprise Application Integration EAI or r/t DW)

- Not either/or

Characteristics of the Two Approaches

Data Warehouse

- Stable
- Reliable
- Some latency
- Simpler
- More static

EAI via WS

- More real time
- Multiple points of failure
- More complex
- More dynamic

Recap:

- WS are like UFD (nails) that is a nifty interoperable way to connect systems.

- Ws do not use any new technology but rely on web servers and XML.

- And in order to do it right, you need an architecture.

Ode to a Disgruntled Programmer

There once was a protocol named SOAP
With whose peculiarities one had to cope
Said one programmer to another
Of technologies I prefer s'mother
So I guess I'll just go home and mope.